(1) Publication number:

0 240 208 A3

12

EUROPEAN PATENT APPLICATION

- (1) Application number: 87302367.5
- 2 Date of filling: 19.03.87

(ii) Int. Cl.4: C12N 15/00 , A01H 1/00 , C12N 5/00

- Priority: 28.03.86 US 845676 17.10.86 US 920574
- ② Date of publication of application: 07.10.87 Bulletin 87/41
- Designated Contracting States:
 AT BE CH DE ES FR GB GR IT LI LU NL SE
- Date of deferred publication of the search report: 03.05.89 Builetin 89/18
- Applicant: CALGENE, INC. 1910 Fifth Street Suite F. Davis California 95616(US)
- ② Inventor: Shewmaker, Christine K. 1501 Cypress Lane
 Davis, California 95616(US)
 Inventor: Kridi, Jean C. 538 Reed Drive
 Davis, California 95616(US)
 Inventor: Hiatt, William R. 2760 Blackburn
 Davis, California 95616(US)
 Inventor: Knauf, Vic 2454 Elendii Lane
 Davis, California 95616(US)
- Representative: Harrison, David Christopher et al
 MEWBURN ELLIS & CO 2/3 Cursitor Street London EC4A 1BQ(GB)
- Anti-sense regulation of gene expression in plant cells.
- Regulation of expression of genes encoded for in plant cell genomes is achieved by integration of a gene under the transcriptional control of a promoter which is functional in the host and in which the transcribed strand of DNA is complementary to the strand of DNA that is transcribed from the endogenous gene(s) one wishes to regulate. The inteco grated gene, referred to as anti-sense, provides an RNA sequence capable of binding to naturally existing RNAs, exemplified by polygalacturonase, and inhibiting their expression, where the anti-sense sequence may bind to the coding, non-coding, or both, portions of the RNA. The anti-sense construction may be introduced into the plant cells in a variety of ways and be integrated into the plant genome for inducible or constitutive transcription of the antisense sequence. A wide variety of plant cell properties may be modified by employing this technique.



EP 87 30 2367

		···		EP 87 30 230
DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with in of relevant pa	ndication, where appropriate, ssages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
0,X	CHEMICAL ABSTRACTS, page 388, no. 74243 US; D. GRIERSON et function of ripenin BIOL. 1987, 4(TOMAT 309-23 * Abstract *	f, Columbus, Ohio, al.: "Expression and g genes", & PLANT	11	C 12 N 15/00 A 01 H 1/00 C 12 N 5/00
0,Y	IDEM		4,5	
X	CHEMICAL ABSTRACTS, page 211, no. 15519 US; P.E. MANSSON et "Characterization o cDNAs from tomato", 1985, 200(3), 356-6 " Abstract "	8q, Columbus, Ohio, al.: f fruit-specific & MOL. GEN. GENET.	11	·
Y	IDEM :		4,5	
X	NATURE, vol. 315, 1 601-603; J. COLEMAN immune system again infection using com (micRNA)" * Page 603, right-h 5-12 *	st bacteriophage plementary RNA	1-3,6- 10	TECHNICAL FIELDS SEARCHED (Int. Cl.4) C 12 N A 01 H
Y	IDEM		4,5	
Y	US: G.E. HOBSON et	for, Columbus, Ohio, al.: "The inhibition ening by silver". &	1-10	·
	The present search report has I	peen drawn up for all claims		
	Piece of search	Date of completion of the search		Examiner
 		20-01-1989	MADDOX A.D.	
CATEGORY OF CITED DOCUMENTS T: theory or prin E: earlier patent after the fillin Y: particularly relevant if combined with another document of the same category L: document cite A: technological background		ocument, but pu date in the applicati for other reason	blished on, or on	



EP 87 30 2367

	DOCUMENTS CONSI	DERED TO BE RELEVA	NT	1
Category	Citation of document with in of relevant pas	dication, where appropriate.	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	BIO/TECHNOLOGY, June 520-527, Ciba-Geigy HELMER et al.: "A ne a marker for plant expression of Escher Beta-galactosidase tobacco cells" * Page 521, left-har paragraph - page 522	Corp., US; G. we chimeric gene as transformation: the richia Coli In sunflower and and column. last	6-9	
X	EP-A-0 159 779 (AG * Page 49, lines 1-9	RIGENETICS)	6,8,9	
Y			7	
X	PROCEEDINGS OF THE USA SCIENCES OF THE USA August 1986, pages Washington, US; J.R. "Inhibition of gene cells by expression * Whole article *	, vol. 83, no. 15, 5372-5376, . ECKER et al.: expression in plant	6,7	TECHNICAL FIELDS SEARCHED (int. Cl.4)
A	IDEM		1-5,8- 10	
Y	J. CELL BIOCHEM., ve C, 1986, page 41, no LOESCH-FRIES et al. alfalfa mosaic virus and anti-sense RNA and their expression tobacco tissue" * Abstract *	o. J108; L.S. : "Cloning of s coat protein gene into a binary vector	7	
	The present search report has be	een drawn up for all claims	_	
	Piace of search	Date of completies of the search	 	Brandner
THI	E HAGUE	20-01-1989	MA	DDOX A.D.
X : par Y : par doc	CATEGORY OF CITED DOCUMEN ticularly relevant if taken alone ticularly relevant if combined with ano ament of the same category hadological background	E : earlier paten after the filli ther D : document ci	ocipio underlying it document, but pi gg date ted in the applicate ed for other reason	sklished on, or

TPO FORM 1500 00.42 (PO001)



Application Number

EP 87 30 2367

	DOCUMENTS CONSI	DERED TO BE RELEVAN	TT	
Category	Citation of document with in of relevant par	dication, where appropriate,	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	IDEM		1-6,8-	
O,A	CHEMICAL ABSTRACTS, page 490, no. 12598; US; P.H. MORGENS et molecular mechanism: ripening", & UCLA S'BIOL. NEW SER. 1987 PLANT GROWTH CONTROL* Abstract *	7c, Columbus, Ohio, al.: "Searching for s involved in fruit YMP. MOL. CELL. , 44(MOL. BIOL.	1,4,11	
A	SCIENCE, vol. 229, pages 345-352; J.G. "Constitutive and consuppression of exoggenes by anti-sense * Whole article *	IZANT et al.: onditional enous and endogenous	1-3,4	
A	CHEMICAL ABSTRACTS, page 159, no. 15979 US; A. SLATER et al characterization of tomato polygalactur ripening-related pr MOL. BIOL. 1985, 5(* Abstract *	r, Columbus, Ohio, .: "Isolation and cDNA clones for onase and other oteins". & PLANT	4,5	TECHNICAL FIELDS SEARCHED (Int. CL4)
A	CHEMICAL ABSTRACTS, vol. 97, 1982, page 456, no. 88858x, Columbus, Ohio, US; R. PRESSEY et al.: "Pectic enzymes in 'Long Keeper' tomatoes", & HORTSCIENCE 1982, 17(3, Sect. 1), 398-400 * Abstract *		4,5	
E	EP-A-0 ² 223 399 (AG * Whole document *	RACETUS) -/-	1-3,5,6	·
	The present search report has b	een drawn up for all claims		
	Place of search	Date of completion of the search		Reminer
TH	E HAGUE	20-01-1989	MADI	DOX A.D.
CATEGORY OF CITED DOCUMENTS X: particularly relevant if taken alone Y: particularly relevant if combined with another document of the same category A: technological background O: non-written disclosure P: intermediate document A: member of the document Cament Cament		ocument, but publidate I in the application for other reasons	lished on, or	

EPO FORM 1503 03.82 (P0401)



Application Number

EP 87 30 2367

Category	Citation of document with i	indication, where appropriate,	Relevant	CLASSIFICATION OF TH
Е	EP-A-0 223 452 (MO		to claim 1-3,5,6 -10	APPLICATION (lat. CL4)
P,X	WO-A-8 605 516 (DU * Page 2, lines 10- 8-20; page 27, line 2; claim 3 *	OKE UNIVERSITY) -22; page 11, lines - 18 - page 28, line	1-3,5-	
E	EP-A-0 240 332 (LU * Whole document *	BRIZOL)	1-3,6- 10	
E	WO-A-8 801 645 (MA	CQUARIE UNIVERSITY)	1-3,6- 10	
E	EP-A-0 271 988 (IC * Whole document *	I PLC)	1-11	
				TECHNICAL FIELDS SEARCHED (Int. CL4)
	·			1
i				
	The present search report has i	been drawn up for all claims		
TH	Place of search E HAGUE	Date of completion of the sec 20-01-1989	ŀ	Examinar DOX A.D.
X : psi Y : psi do:	CATEGORY OF CITED DOCUME ricularly relevant if taken alone ricularly relevant if combined with an uncert of the same category hnological background	NTS T: theory or E: earlier pa after the other D: documen	r principle underlying the atent document, but publi filing date it cited in the application of cited for other reasons	invention ished on, or